



Vermont Municipal Employees' Retirement System

Experience Review

July 1, 2014 through June 30, 2019

October 2020 / Matt Strom / Kathy Riley

Actuarial Certification

This experience study of the Vermont Municipal Employees' Retirement System for the five year period ending June 30, 2019 was prepared in accordance with generally accepted actuarial principles and practices. This study was completed at the request of the Board to review and update, as necessary, the assumptions used in the actuarial valuation. This document should not be shared, copied or quoted, in whole or in part, without the consent of Segal, except to the extent otherwise required by law.

The census information on which this experience study was based was prepared by the Office of the State Treasurer for use in the annual valuations.

The actuarial calculations were directed under the supervision of Kathleen Riley, FSA, MAAA, EA, and Matthew Strom, FSA, MAAA, EA. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this experience study is complete and accurate. Further, in our opinion, the recommended assumptions are reasonably related to the experience of and the expectations for the System.

Agenda

Overview

Summary of Recommended Assumptions

Cost Impact

Analysis:

- Economic Assumptions
- Demographic Assumptions

Overview: Purpose of an Experience Study

An experience study provides the basis for developing recommended assumptions to be used in the annual actuarial valuation

- Performed on a periodic basis, typically every five years
- Last VMERS experience study was conducted in 2016 for the 5-year period ending June 30, 2014
 - Subsequently, a review of certain economic assumptions (investment return, inflation, and COLA) and a review of the mortality assumption were prepared in 2017
- Current study is based on the period July 1, 2014 through June 30, 2019

Actuarial Standards of Practice No. 27 and 35 provide guidance on best practices for performing assumption-setting analysis

- Each assumption should be “reasonable”

Segal's role is to make appropriate recommendations to the Board for each assumption

- The assumptions are the Board's assumptions and the Board can adopt all, none, or some of the recommendations of the actuary

Overview: How Assumptions Are Set

Review past experience (“actual”) and compare with assumptions (“expected”)

Determine trends – make judgments about the future

Develop component parts of each assumption

- Maintain internal consistency

Keep in mind:

- No “right” answer
- Assumptions are long-term

Overview: Actuarial Assumptions

Economic

- Inflation
- Investment return
- Salary increase
- Payroll growth
- COLA

Demographic

- Death after retirement
- Death in active service
- Retirement
- Termination
- Disability

Actuaries make assumptions as to when and why a member will leave active service and estimate the amount, duration and present value of the pension benefits paid.

Summary of Assumption Impact

Assumption	Description	Impact on Liability/Cost	Impact on Gain/Loss
Inflation	The rate at which price levels are rising and purchasing power is falling	The impact that inflation has on liability and cost varies by each economic assumption	The impact that inflation has on gain/loss varies by each economic assumption
Investment Return	Based on invested plan asset categories and assumed rates of return for each asset class	Higher assumption causes lower liability and cost	Higher than anticipated actuarial return will create actuarial gains
Salary Increases	The expected rate of future salary increases for employees at various ages or years from hire	Higher assumption causes higher liability and cost	Higher than anticipated salary increases to actives will create actuarial losses
Payroll Growth	Used to project covered payroll to estimate the employer normal cost for budgeting purposes	Higher assumption causes higher cost, but has no impact on liability	Payroll growth has no impact on gain/loss
COLA	An annual increase in benefits to counteract inflation	Higher assumption causes higher liability and cost	Higher than anticipated COLAs will create actuarial losses
Mortality	The probability of dying within one year at each age	Lower mortality increases liability and cost	Higher than anticipated mortality will create actuarial gains
Retirement	The age (or ages) when employees are expected to retire	Earlier assumed retirement usually increases liability and cost	If more members retired later in their careers, this could result in gains. Generally, losses result when a member retires earlier without a full actuarial reduction. Other scenarios may result in gains/losses.
Termination	The expected rate of termination for employees at various ages or years from hire	Greater assumed termination decreases liability and cost	Higher than anticipated terminations will likely result in actuarial gains
Disability	The age (or ages) when employees are expected to become disabled	Greater incidence of disability usually slightly increases liability and cost	Greater incidence of disability than anticipated will likely result in slight actuarial losses

Summary of Economic Assumptions

Assumption	Current	Proposed	Impact on Actuarially Determined Contribution
Inflation	2.50%	2.30%	N/A
Investment Return	7.50%	7.15% ¹	Increase
Salary Scale	5.00% (including inflation of 2.50%)	Varying service based rates from 0-10 years of service, then a single rate of 2.20% for all subsequent years, plus revised inflation of 2.30%	Slight Decrease
Payroll Growth	N/A	3.00%	N/A
COLA	1.15% for Group A and 1.30 for Groups B/C/D	1.10% for Group A and 1.20% for Groups B/C/D	Slight Decrease

¹ A range of reasonable investment return assumptions was first identified (7.00% to 7.25%). Within the reasonable range, 7.15% was proposed because it results in a similar confidence level as the current assumption when last studied. However, we believe that choosing the lowest end of the reasonable range, and, therefore, increasing the associated confidence level, is preferable. During the discussions regarding this and related presentations, it was also noted that the target asset allocation on which our analysis was based had not yet been reached and would not be reached for several years. As a result, all Boards, including VPIC, approved an investment return assumption of 7.00%.

Summary of Demographic Assumptions

Assumption	Current	Proposed	Impact on Actuarially Determined Contribution
Healthy Post-Retirement Mortality - Retirees	Groups A/B/C: 98% of RP-2006 tables, blended 60% Blue Collar Annuitant and 40% Healthy Annuitant, with generational projection using Scale SSA-2017	Groups A/B/C: 104% of 40% PubG-2010 General Healthy Retiree amount-weighted below-median and 60% of PubG-2010 General Employee amount-weighted, with generational projection using scale MP-2019	Increase
	Group D: RP-2006 Blue Collar Annuitant with generational projection using Scale SSA-2017	Group D: PubG-2010 General Healthy Retiree amount-weighted, with generational projection using scale MP-2019	Increase
Healthy Post-Retirement Mortality – Beneficiaries	Same as Retirees mortality above	Groups A/B/C: 70% Pub-2010 Contingent Survivor amount-weighted below-median and 30% of Pub-2010 Contingent Survivor amount-weighted, with generational projection using scale MP-2019	Slight Decrease
		Group D: Pub-2010 Contingent Survivor amount-weighted, with generational projection using scale MP-2019	Slight Decrease
Disabled Post-Retirement Mortality	RP-2006 Disabled Mortality Table with generational projection using Scale SSA-2017	PubNS-2010 Non-Safety Disabled Retiree amount-weighted with generational projection using Scale MP-2019	Slight Increase
Active Mortality	Groups A/B/C: 98% of RP-2006 tables, blended 60% Blue Collar Employee and 40% Healthy Employee, with generational projection using Scale SSA-2017	Groups A/B/C: 40% PubG-2010 General Employee amount-weighted below-median and 60% of PubG-2010 General Employee amount-weighted, with generational projection using Scale MP-2019	Slight Increase
	Group D: RP-2006 Blue Collar Employee with generational projection using Scale SSA-2017	Group D: PubG-2010 General Employee amount-weighted above-median, with generational projection using scale MP-2019	Slight Increase

Summary of Demographic Assumptions

Assumption	Current	Proposed	Impact on Actuarially Determined Contribution
Active Retirement	Groups A/B/C: Separate sets of gender distinct, age-based rates per group Group D: Separate sets of age-based rates for members with <20 years of service and for members with 20 or more years of service	Group A: Decreasing the rates throughout all ages	Slight Decrease
		Group B: For females, slightly decreasing the rates at younger ages and then increasing the rates at later ages. For males, slightly decreasing the rates at most ages.	Slight Decrease
		Group C: Simplifying the assumption to a unisex table that more accurately aligns with the actual experience for both males and females.	Slight Decrease
		Group D: For members with less than 20 years of service, increasing the rates for ages 55-59. For members with 20 or more years of service, no changes.	Slight Increase
Inactive Retirement	All deferred members assumed to retire at Normal Retirement Age with a deferred vested benefit	Add a rate of 10% from ERA for each year until NRA, then 100% at NRA	Slight Increase
Termination	Separate sets of gender distinct, service-based rates for males, females ages 25-34, and all other females.	Simplify female rates to one set of slightly reduced rates for all females and no change to male rates	Slight Decrease
Disability Retirement	Gender distinct age-based rates	No changes	N/A
Spouse Information	85% male members and 50% female members are married, male spouses are three years older than female spouses, and 100% of spouses are opposite gender	No changes	N/A

Cost Impact (Based on the June 30, 2019 Actuarial Valuation)

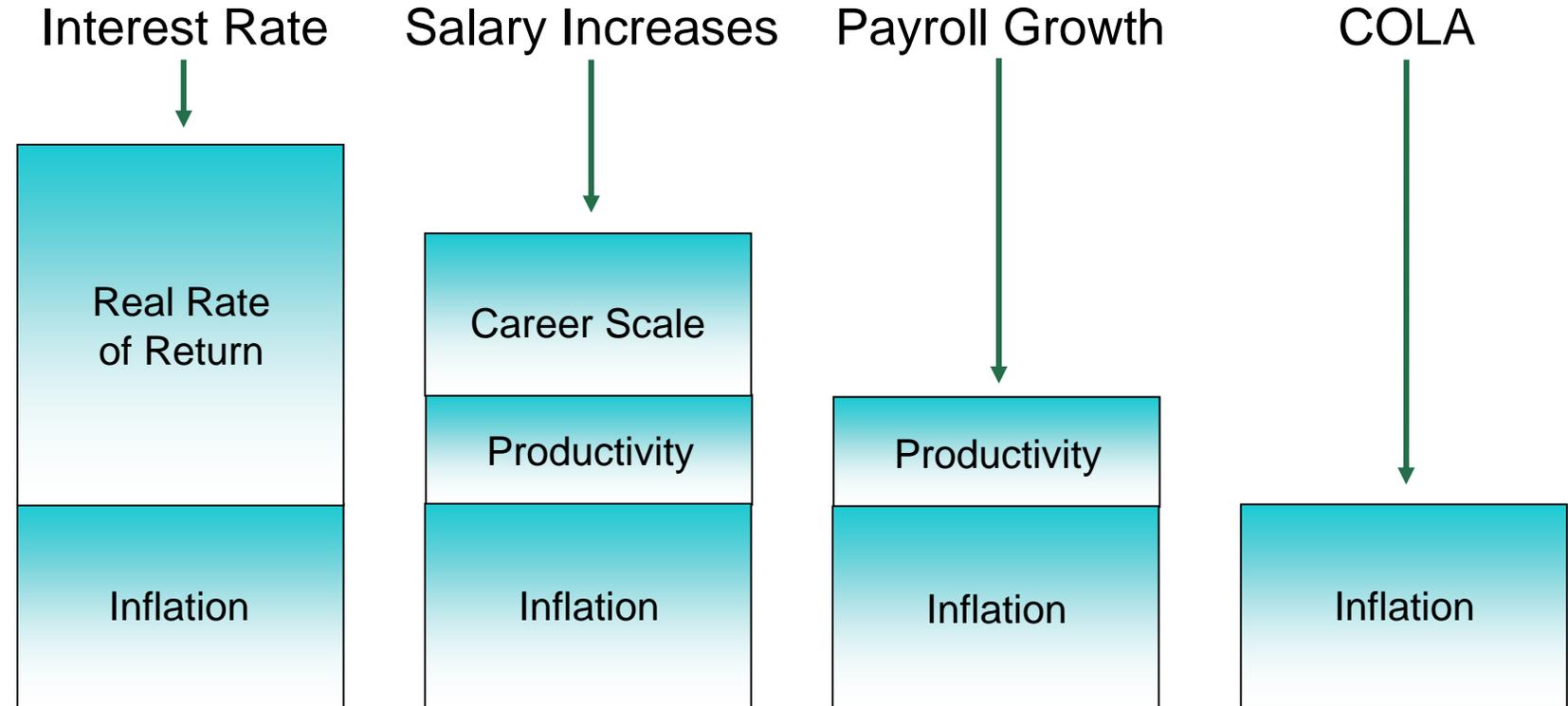
Description	Current Assumptions	All Proposed Demographic Assumptions	All Proposed Demographic and Economic Assumptions Including 7.00%
Actuarial Accrued Liability	\$896.3M	\$901.4M	\$937.3M
<i>Change from prior column</i>		+5.1M	+35.9M
<i>Cumulative change</i>		+5.1M	+41.0M
Actuarial Value of Assets	\$718.3M	\$718.3M	\$718.3M
Unfunded Actuarial Accrued Liability	\$178.0M	\$183.1M	\$218.9M
Funded Percentage	80.1%	79.7%	76.6%
<i>Change from prior column</i>		-0.4%	-3.1%
<i>Cumulative change</i>		-0.4%	-3.5%
Normal Cost	\$32.8M	\$32.6M	\$34.7M
<i>Change from prior column</i>		-0.2M	+2.1M
<i>Cumulative change</i>		-0.2M	+1.9M
Actuarially Determined Contribution for FY 2021	\$22.6M	\$23.0M	\$27.0M
<i>Change from prior column</i>		+0.4M	+4.0M
<i>Cumulative change</i>		+0.4M	+4.4M

Cost Impact (Based on the June 30, 2019 Actuarial Valuation)

Description	Current Assumptions	All Proposed Demographic Assumptions	All Proposed Demographic and Economic Assumptions Including 7.00%
Total – Actuarially Determined Contribution Rate for FY 2021	7.039%	7.143%	8.407%
<i>Change from prior column</i>		+0.104%	+1.264%
<i>Cumulative change</i>		+0.104%	+1.368%
Group A – Actuarially Determined Contribution Rate for FY 2021	3.898%	4.309%	5.375%
<i>Change from prior column</i>		+0.411%	+1.066%
<i>Cumulative change</i>		+0.411%	+1.477%
Group B – Actuarially Determined Contribution Rate for FY 2021	7.083%	7.135%	8.280%
<i>Change from prior column</i>		+0.052%	+1.145%
<i>Cumulative change</i>		+0.052%	+1.197%
Group C – Actuarially Determined Contribution Rate for FY 2021	9.807%	9.440%	11.125%
<i>Change from prior column</i>		-0.367%	+1.685%
<i>Cumulative change</i>		-0.367%	+1.318%
Group D – Actuarially Determined Contribution Rate for FY 2021	12.554%	13.346%	15.381%
<i>Change from prior column</i>		+0.792%	+2.035%
<i>Cumulative change</i>		+0.792%	+2.827%

Basis for Setting Economic Assumptions

Each economic assumption has 2 or 3 components



Each component should be consistent across all economic assumptions, but may include a provision for adverse deviation.

Actuarial Cost Method

An actuarial cost method determines how to assign liabilities to past years (accrued liability), the current year (normal cost), and future years

Some byproducts of an actuarial cost method are:

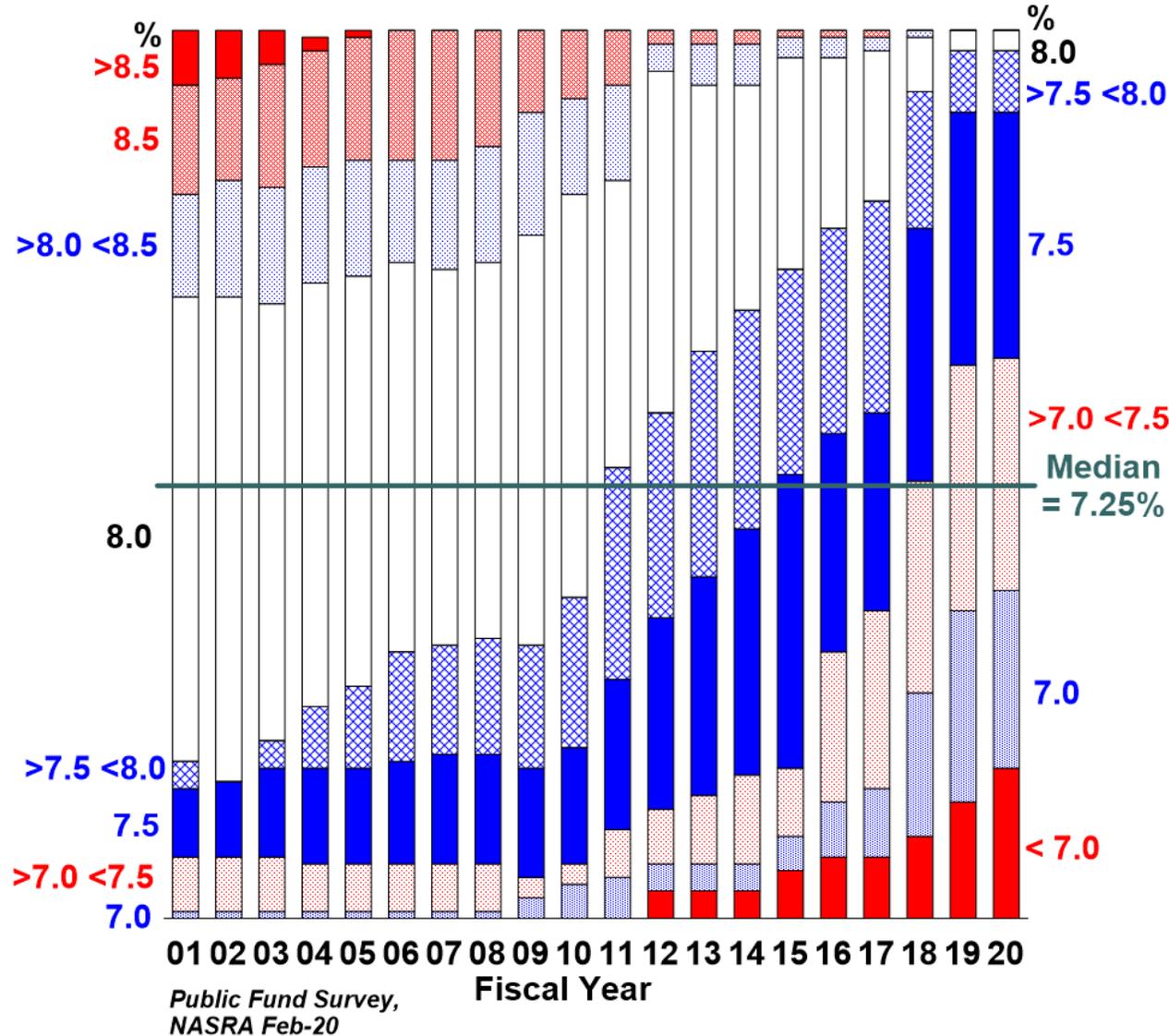
- Funded percentage: actuarial value of assets ÷ accrued liability
- Actuarially determined contribution: normal cost + amortization of unfunded accrued liability

The current actuarial cost method is non-standard and defers liability gains and losses over a longer period of time

In addition, there is no true “accrued liability” and “normal cost” determined under the current method

We recommend adopting the Entry Age Normal actuarial cost method, which is the most common method for public sector plans and reflects costs evenly over time as a level percentage of payroll.

Distribution of Historical Return Assumptions



Since 2001, the median investment return assumption has been moving downward and this trend is expected to continue as more systems complete experience review cycles.

Assumed Rate of Inflation

Inflation represents the annual increase in the cost of living

The current inflation assumption is 2.50%

- Inflation is a component of the following economic assumptions:
 - Investment return
 - Individual salary increases and payroll growth
 - Cost-of-living-adjustments

Segal's recommendation is to lower the assumption from 2.50% to 2.30%, based on:

- The average 20-year inflation assumption from the 2019 Horizon Survey of Capital Market Expectations is 2.29%;
- The market's expectation of inflation is similar over 20-year and 30-year time horizons; and
- The Philadelphia Federal Reserve Bank Survey of Professional Forecasters 10-year outlook (2.20%) is consistent with the 10-year average from the Horizon Survey (2.21%).

Assumed Rate of Inflation (*continued*)

As of June 30, 2019, the historical national inflation (CPI-U) averages are:

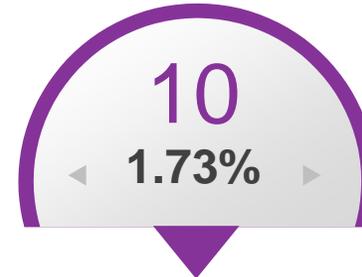


5-year Average

The most recent 5-year average increase in CPI-U is 1.45%

10-year Average

The most recent 10-year average increase in CPI-U is 1.73%



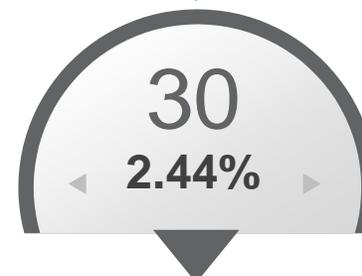
20-year Average

The most recent 20-year average increase in CPI-U is 2.19%



30-year Average

The most recent 30-year average increase in CPI-U is 2.44%



Assumed Rate of Inflation (*continued*)

In addition to historical inflation, other metrics to consider are current market expectations and estimates from professional forecasters and economists

By observing the difference between the yields on US Treasury bonds with and without inflation indexing, we can calculate the rate of inflation that investors expect. As of June 2019, the yields on 10-year, 20-year, and 30-year Treasury bonds were as follows:

	10-Year	20-Year	30-Year
Non-inflation indexed:	2.07%	2.36%	2.57%
Inflation indexed:	0.37%	0.59%	0.79%
Delta:	1.70%	1.77%	1.78%

- The differences ranging between 1.70% to 1.78% represent the financial market's current expectations of inflation over the next 10 to 30 years

Assumed Rate of Inflation (*continued*)

Source	10-Year	20-Year
Federal Reserve Bank of Philadelphia Fourth Quarter 2019 Survey of Professional Forecasters	2.20%	
2019 Horizon Survey of Capital Market Expectations	2.21%	2.29%
NEPC	2.25%*	
Segal Marco Advisors	2.00%	2.00%

*2.25% is the 2019 NEPC 5-7 year inflation assumption

We recommend that the Board lower the inflation assumption from 2.50% to 2.30%

Assumed Rate of Investment Return

The investment return is a principal assumption used in any actuarial valuation and is used to discount future expected benefit payments to the valuation date in order to determine the liabilities of the plan

The current investment return assumption of 7.50% consists of three components:

- Inflation*: 2.50%
- Real rate of return: 5.05%
- Adjustment for conservatism: (0.05%)

Our approach is to analyze inflation and real return separately

*The proposed inflation assumption is 2.30%

Basis for Expected Real Rate of Return

We have based our analysis of the expected real rate of return on the Horizon Survey of Capital Market Assumptions (2019 Edition)

- This survey compiles and averages the capital market assumptions of 34 investment consultants (including NEPC and Segal Marco Advisors)
 - 16 respondents provided assumptions for “long term”, or 20 years
- Expected arithmetic returns are used to determine the expected returns by asset class
- The 20-year expected geometric portfolio real rate of return was generated from the 50th percentile of 5,000 simulated portfolio return trials

Geometric Real Rate of Return

	Asset Class	20-Year Horizon Annual Arithmetic Real Return	Target Allocation ¹	Weighted Real Return
Equity	US Large Cap	6.05%	11.63%	0.70%
	US Small Cap	7.23%	10.63%	0.77%
	International Developed	7.01%	14.59%	1.02%
	Emerging Markets	9.38%	6.15%	0.58%
	Private Equity	10.53%	10.00%	1.05%
Fixed/Alternative	US Core	2.17%	20.00%	0.43%
	International Debt Emerging	4.47%	4.00%	0.18%
	TIPS	1.40%	3.00%	0.04%
	Real Estate	5.65%	8.00%	0.45%
	Hedge Funds	4.32%	10.00%	0.43%
	Infrastructure	6.17%	2.00%	0.12%
	Total		100%	5.79%
	Adjustment to Geometric			(0.54%)
	Geometric Real Rate of Return²			5.25%

¹ Several equity classes include a portion of the target allocation to Global Equity.

² Geometric Real Rate of Return is the compounded 50th percentile return over 20 years. Arithmetic returns represent the expected return for a single year. Geometric returns take into account year-over-year compounding over the 20 year period.

Adjustment for Current Market Outlook

From 2019 to 2020, the investment market outlook changed and many investment consultants lowered their expectations

- Capital market assumptions from the Horizon Survey are aggregated based on investment consultant expectations from Q1 2019
- As an example, using VPIC's target allocation, the change in 50th percentile return based on Segal Marco Advisors capital market assumptions between January 2019 and January 2020 is a decrease of 0.32%
- We recommend an additional downward adjustment to the expected real rate of return to reflect the change in market outlook since early 2019

Geometric real rate of return	5.25%
Less adjustment for update in market outlook from January 2019 to January 2020	<u>(0.30%)</u>
Modified real rate of return	4.95%

Assumed Rate of Return Alternatives

Over a 20-year period, the Fund is expected to earn an annual real rate of return of at least 4.95% half of the time

- Lowering the expected real rate of return to 4.85% will increase the likelihood of meeting the expectation over a 20-year period to 51.3%

Component	Current	50/50: 7.25%	7.15%	7.00%
Inflation	2.50%	2.30%	2.30%	2.30%
Real Rate of Return	5.05%	4.95%	4.95%	4.95%
Adjustment for Adverse Deviation	(0.05%)	(0.00%)	(0.10%)	(0.25%)
Total	7.50%	7.25%	7.15%	7.00%
Confidence Level*	51%	50.0%	51.3%	53.1%

* The Confidence Level indicates the likelihood that expectations will be met over a 20-year period. An increase in the confidence level indicates that the plan is more likely to meet the expected rate of return.

We recommend that the Board lower the return assumption from 7.50% to 7.15%¹ to maintain a confidence level consistent with how the current assumption was set. A lower assumption such as 7.00% would increase that confidence level to 53.1%.

¹ A range of reasonable investment return assumptions was first identified (7.00% to 7.25%). Within the reasonable range, 7.15% was proposed because it results in a similar confidence level as the current assumption when last studied. However, we believe that choosing the lowest end of the reasonable range, and, therefore, increasing the associated confidence level, is preferable. During the discussions regarding this and related presentations, it was also noted that the target asset allocation on which our analysis was based had not yet been reached and would not be reached for several years. As a result, all Boards, including VPIC, approved an investment return assumption of 7.00%.

Assumed Rates of Individual Salary Increase

In order to project future benefits, salaries are projected forward over the expected lifetime for each active member

Individual member salary increase components:

- Inflation
- Productivity
- Merit and seniority increases

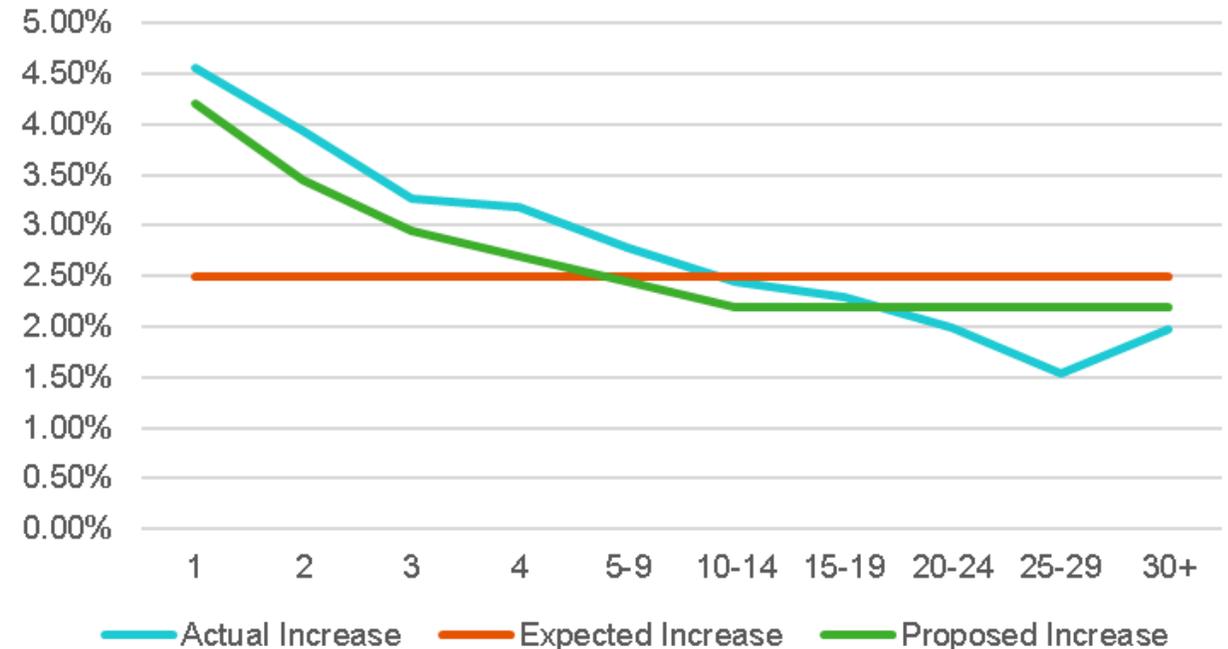
Since merit and seniority increases are unique to each retirement system, it is appropriate to base this assumption on recent experience

- We study the merit and seniority increases (plus productivity) separately from inflation
- Between 2014 and 2019, inflation averaged 1.5%

Assumed Rates of Salary Increase *(continued)*

The following table compares the actual and expected individual salary increases over the past 5 years, adjusted to remove actual annual inflation of about 1.5% over the experience period:

Service	Actual Increase	Expected Increase	Proposed Increase
1	4.55%	2.50%	4.20%
2	3.94%	2.50%	3.45%
3	3.26%	2.50%	2.95%
4	3.18%	2.50%	2.70%
5-9	2.78%	2.50%	2.45%
10-14	2.44%	2.50%	2.20%
15-19	2.29%	2.50%	2.20%
20-24	1.99%	2.50%	2.20%
25-29	1.54%	2.50%	2.20%
30+	1.98%	2.50%	2.20%
Total	2.85%	2.50%	2.62%



Based on this experience, we recommend changing the assumption to varying service based rates from 0-10 years of service, then a single rate of 2.20% for all subsequent years.

Assumed Rate of Payroll Growth

The amortization of the unfunded actuarial accrued liability (UAAL) is calculated as a level percentage of payroll over a closed period of time

The amortization amount is expected to increase each year as payroll increases (i.e., amortization payments are back loaded)

A lower payroll growth assumption is more conservative

- A lower assumption results in larger amortization payments (e.g., 0% would equate to level dollar)

A payroll growth assumption typically includes inflation and a productivity component. There is currently no payroll growth assumption used in the valuation.

Assumed Rate of Payroll Growth (*continued*)

As the recommended inflation component is 2.30%, we need to examine the productivity component

**Productivity can be measured as the excess of the increase in the National Average Wage over inflation.
As of June 2019:**

- The 20-year average of the National Average Wage is 3.0%
- The 20-year average inflation is 2.2%
- Therefore, productivity has averaged about 0.8% over the last 20 years

Assumed Rate of Payroll Growth (*continued*)

The following table summarizes the Fund's historical payroll and active population growth:

Year Ended June 30	Annualized Payroll (\$ in Millions)	Active Members
2019	\$306.1	7,630
2014	231.0	6,664
2009	191.5	6,533
2004	125.9	5,633
2001	92.9	4,814
• 5-year average*:	5.8%	2.8%
• 10-year average*:	4.8%	1.6%
• 15-year average*:	6.1%	2.1%
• 19-year average*:	6.9%	2.6%

Payroll increases have averaged around 3.0%/year and 3.2%/year over the last five and ten years, respectively, adjusting for headcount

*Estimated the 2015 Payroll/Active Member amounts

Assumed Rate of Payroll Growth (*continued*)

The following table summarizes the components of the recommended payroll growth assumption:

Component	Recommended
Inflation	2.30%
Productivity	<u>0.70%</u>
Total payroll growth	3.00%

We recommend a 3.00% payroll growth assumption

Assumed COLA Increases

Cost of Living Adjustments (COLAs) are generally linked to inflation

VMERS contains the following COLA provisions:

- Equal to **one-half of CPI**, but not more than **2%** (Group A)
- Equal to **one-half of CPI**, but not more than **3%** (Groups B/C/D)

We studied expected future COLAs based on stochastic projections of the recommended 2.30% inflation assumption, subject to the above parameters

As a result, we recommend the following COLA assumptions:

- Group A: 1.10% (currently 1.15%)
- Groups B/C/D: 1.20% (currently 1.30%)

Overview: How Mortality Assumption Is Set

Review past experience

Compare past experience (“actual”) with assumptions (“expected”)

- Examine both headcounts and benefit-weighted experience

Determine appropriate standardized table as basis for new assumption

Assess credibility of data set and calculate weighting factor

- Actual experience can be the assumption basis for fully-credible data
- Partially-credible data is blended with standardized table
- Typically, we assume 1,082 deaths needed in a subgroup to be considered fully-credible
 - 90% confident that results are within a range of 5% around the mean

Death After Retirement

Our analysis uses a benefit-weighted approach, which weights the probability of death with each annuitant's pension benefit

- This methodology takes into consideration any correlation between the health of the annuitant and the size of the benefit

In 2019, the Society of Actuaries published a series of Pub-2010 mortality tables derived from public plan experience

- Three broad classifications based on teachers, public safety, and general employees
- Contingent annuitant mortality studied separately from retiree mortality
 - Contingent annuitant mortality is generally worse than retirees
- Separate mortality tables for “healthy” annuitants and those members retiring with a disability pension

For purposes of comparing actual experience to expected, Pub-2010 mortality rates have been projected to 2016, the mid-point of the experience period, with scale MP-2019

Death After Retirement (*continued*)

There are 3 separate versions of each of the Pub-2010 table classifications: Baseline, Above Median, and Below Median.

The Pub-2010 report includes an “Income Percentile Amounts by Gender, Job Category, and Status” table showing the median income between Employees, Retirees, and Contingent Survivors from the underlying dataset.

- In order to determine which Pub-2010 table(s) should be applied, we separated the data by group/status/gender and identified the portion of members above/below the respective median amounts.
- Using these results, we recommended the Pub-2010 table variations that most accurately fits the data.

The current assumptions are separated between Groups A/B/C, and Group D. For these groups, the following tables are used:

- Groups A/B/C: 98% of RP-2006 tables, blended 60% Blue Collar Annuitant and 40% Healthy Annuitant, with generational projection using Scale SSA-2017
- Group D: RP-2006 Blue Collar Annuitant with generational projection using Scale SSA-2017

Death After Retirement (*continued*)

Over the experience period, there were fewer actual retiree deaths than expected and there were more actual beneficiary deaths than expected for Groups A/B/C

Recommend updating base tables to appropriate Pub-2010 mortality tables, with adjustments for above/below median groups and for VMERS-specific experience where “credible” data exists

- PubG-2010 Retiree Table based on general employee datasets ages 55 through 120 (baseline, above median, and below median)
- PubG-2010 Employee Table based on general employee datasets ages 18 through 80 (baseline, above median, and below median)
- PubNS-2010 Non-Safety Disabled Retiree Table based on general employee datasets
- Pub-2010 Contingent Survivor Table based on entire dataset of contingent annuitants (baseline, above median, and below median)

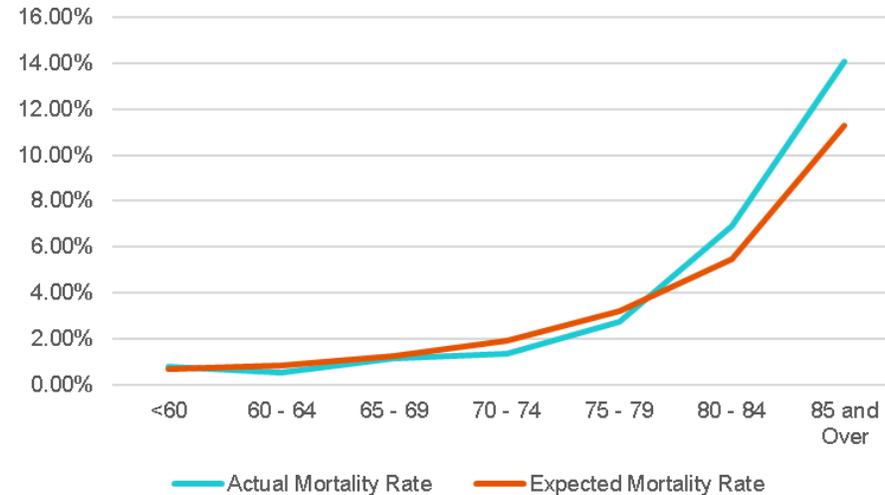
Death After Retirement (*continued*)

Recommend reflecting future mortality improvement by applying Projection Scale MP-2019 on a generational basis

- The Social Security Administration Office of the Chief Actuary has recently released its report on long-range demographic assumptions used in the 2020 Trustees report. The report includes a projection of mortality improvement, which is used to generate projection scale SSA-2020. This scale reflects historical U.S. population mortality data, while MP-2019 reflects historical pensioner mortality data.

Analysis – Healthy Retiree Mortality (Unisex) – Groups A/B/C

Actual Versus Expected Experience, Benefit-Weighted Basis



Basis	Exposures	Actual Deaths/Benefits for Participants who Died	Expected	Actual to Expected***
Counts	12,243	323*	325	99%
Benefits**	\$108,477	\$2,336	\$2,421	96%

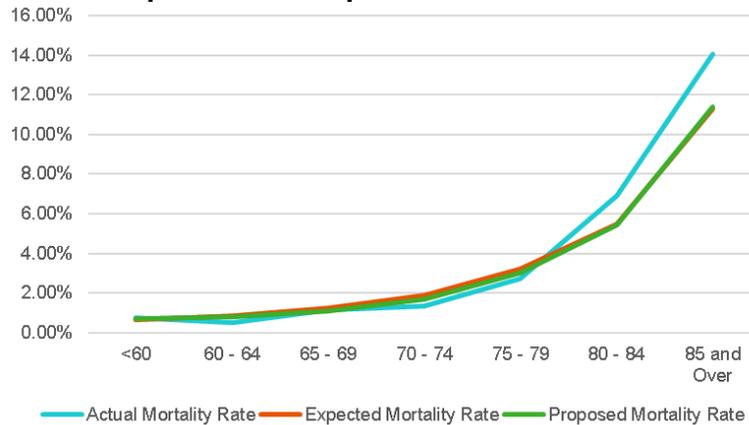
* 323 actual deaths in the observation period yields partial credibility of 55%

** Based on annual benefits in thousands of dollars

*** Actual to Expected ratios indicate how well the actual experience aligns with the current assumptions. The closer the ratio is to 100%, the closer the current assumptions align with the actual experience.

Analysis – Healthy Retiree Mortality (Unisex) – Groups A/B/C

Actual Versus Proposed Experience, Benefit-Weighted Basis



Adjusted median benefits from the Pub-2010 General dataset were \$22,500 for males and \$12,600 for females

From the VMERS dataset, the following percentage of members had benefit amounts above/below the median

	Number	Percentage
Total	4,827	
Above	1,474	31%
Below	3,353	69%

To determine the adjustments to the tables, 31% of the 69% below-median benefit amounts are combined with 31% of the above-median amounts to form a “homogenous” group representing 62% of retired members. The remaining 38% are weighted below-median.

On a benefit-weighted basis, 40% Below Median PubG-2010 Retiree and 60% PubG-2010 Retiree Table results in a reduction of \$2,195,000 in benefits due to the proposed assumption

- Credibility-weighted adjustment (55%) results in a reduction of \$2,272,000 in benefits due to the proposed assumption

Recommend using 104% of 40% Below Median PubG-2010 Retiree table and 60% PubG-2010 Retiree Table

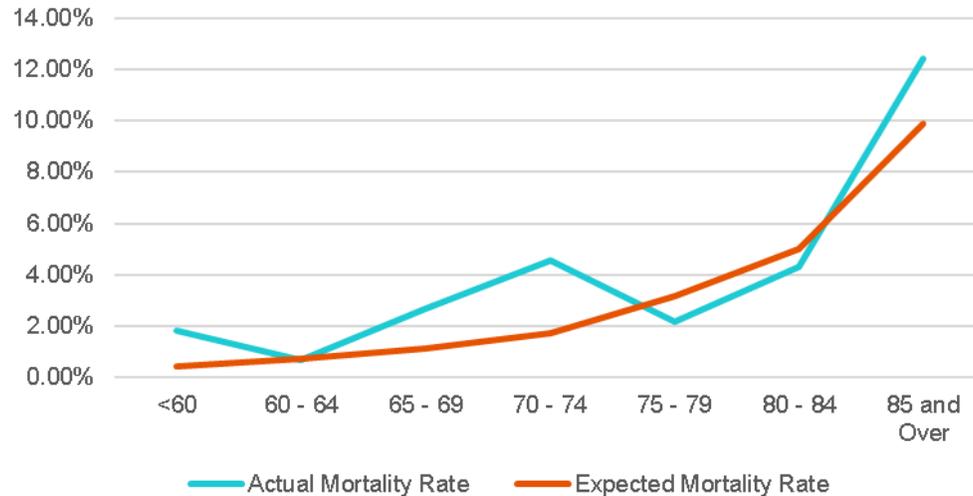
Basis	Exposures	Actual Benefits for Participants who Died	Proposed	Actual to Proposed**
Benefits*	\$108,477	\$2,336	\$2,283	102%

* Based on annual benefits in thousands of dollars

**Actual to Proposed ratios indicate how well the actual experience aligns with the proposed assumptions. The closer the ratio is to 100%, the closer the proposed assumptions align with the actual experience.

Analysis – Beneficiary Mortality (Unisex) – Groups A/B/C

Actual Versus Expected Experience, Benefit-Weighted Basis



Basis	Exposures	Actual Deaths/Benefits for Participants who Died	Expected	Actual to Expected***
Counts	991	50*	36	139%
Benefits**	\$5,666	\$233	\$176	133%

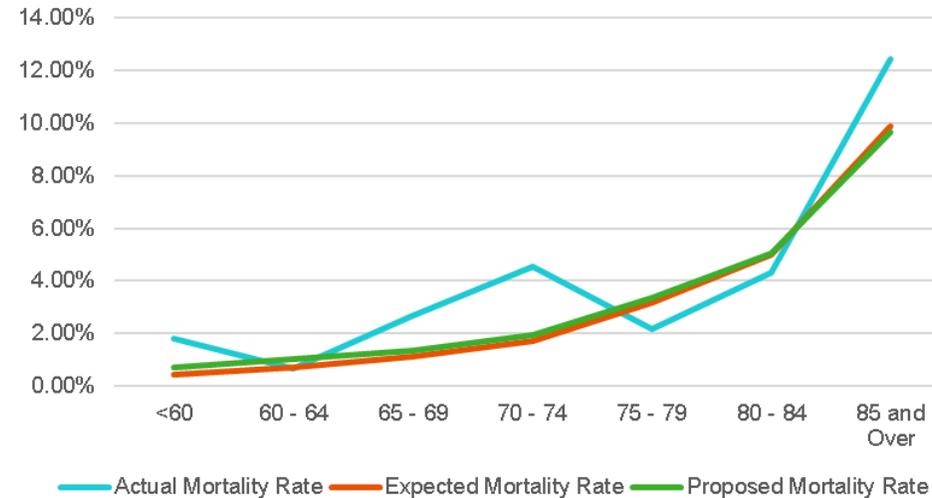
* 50 actual deaths in the observation period yields partial credibility of 22%

** Based on annual benefits in thousands of dollars

*** Actual to Expected ratios indicate how well the actual experience aligns with the current assumptions. The closer the ratio is to 100%, the closer the current assumptions align with the actual experience.

Analysis – Beneficiary Mortality (Unisex) – Groups A/B/C

Actual Versus Proposed Experience, Benefit-Weighted Basis



Recommend using 70% Below Median Pub-2010 Contingent Survivor and 30% Pub-2010 Contingent Survivor Table

- The limited actual experience is insufficient to warrant making an adjustment to the published tables

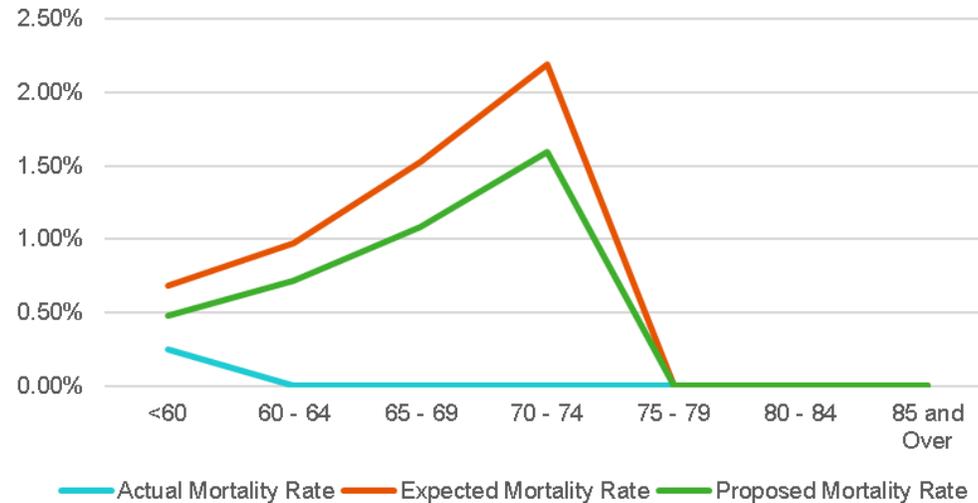
Basis	Exposures	Actual Benefits for Participants who Died	Proposed	Actual to Proposed**
Benefits*	\$5,666	\$233	\$184	127%

* Based on annual benefits in thousands of dollars

** Actual to Proposed ratios indicate how well the actual experience aligns with the proposed assumptions. The closer the ratio is to 100%, the closer the proposed assumptions align with the actual experience.

Analysis – Healthy Retiree Mortality (Unisex) – Group D

Actual Versus Proposed Experience, Benefit-Weighted Basis



Recommend using the Unadjusted PubG-2010 Healthy Retiree Table

- The limited actual experience is insufficient to warrant making an adjustment to the published table

Basis	Exposures	Actual Benefits for Participants who Died	Expected	Actual to Expected**	Proposed	Actual to Proposed**
Benefits*	\$4,758	\$6	\$44	14%	\$32	19%

* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Analysis – Beneficiary Mortality (Unisex) – Group D

Recommend using the Unadjusted Pub-2010 Contingent Survivor Table

- The limited actual experience is insufficient to warrant making an adjustment to the published table

Basis	Exposures	Actual Benefits for Participants who Died	Expected	Actual to Expected**	Proposed	Actual to Proposed**
Benefits*	\$12	\$0	\$0	0%	\$0	0%

* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Analysis – Healthy Retiree & Beneficiary Mortality

- The Appendix includes information on actual and expected experience separately for males and females
- Because each group individually yields less credibility, the experience has been combined to determine the credibility weighting factor that was used

Death After Retirement – Disabled

Mortality experience for male disabled annuitants has been less than expected, while for females it has been greater than expected

- The ratio of actual to expected deaths on a benefit-weighted basis for Females is 144%
- The ratio of actual to expected deaths on a benefit-weighted basis for Males is 76%

We recommend updating to the “non-safety” version of the Pub-2010 mortality table for disabled retirees

- The limited actual experience is insufficient to warrant making an adjustment to the published table

Recommend accounting for future mortality improvement by applying Projection Scale MP-2019 on a generational basis

Death After Retirement – Disabled (*continued*)

Females:

Actual Versus Proposed Experience, Benefits-Weighted Basis

Basis	Exposures	Actual Deaths/ Benefits for Participants who Died	Expected	Actual to Expected**	Proposed	Actual to Proposed**
Counts	136	10	4	245%		
Benefits*	\$2,285	\$89	\$62	144%	\$61	145%

Males:

Actual Versus Proposed Experience, Benefits-Weighted Basis

Basis	Exposures	Actual Deaths/ Benefits for Participants who Died	Expected	Actual to Expected**	Proposed	Actual to Proposed**
Counts	185	5	6	82%		
Benefits*	\$4,440	\$102	\$134	76%	\$121	85%

* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Death While In Active Service

Mortality rates applied to active members

- Very few members die in active service
 - Liability associated with active death is a small percentage of the total liability
 - Plan experience is insufficient to set assumption

The current assumptions include separate mortality tables for Groups A/B/C and Group D

- Since we are using the new PubG-2010 Retiree Tables for retired lives, we recommend using the PubG-2010 Employee Table for active members
 - No adjustment to the published table, given the limited credibility of the group

Death While In Active Service (*continued*)

Similar to the Death after Retirement analysis:

- In order to determine which PubG-2010 table(s) should be applied, we separated the data by group and gender and tested how many members were above/below the respective median amounts.
- We then used these amounts to recommend which of the PubG-2010 tables would most accurately represent the data.

Adjusted median salaries from the Pub-2010 dataset were \$51,500 for males and \$39,000 for females

From the VMERS dataset, the following percentage of members had salaries above/below the median

	Groups A/B/C		Group D	
	Number	Percentage	Number	Percentage
Total	5,922		146	
Above	1,737	29%	139	95%
Below	4,185	71%	7	5%

For Groups A/B/C, we recommend using 40% of the Below Median PubG-2010 Employee Table and 60% of the PubG-2010 Employee Table

For Group D, we recommend using the Above Median PubG-2010 Employee Table

Retirement Eligibilities

Eligibility criteria for retirement differs by group:

- Group A
- Group B
- Group C
- Group D

	Unreduced Benefits	Reduced Benefits
Group A	Earlier of age 65 with 5 years of service or age 55 with 35 years of service	age 55 with 5 years of service
Group B	Earlier of age 62 with 5 years of service or age 55 with 30 years of service	age 55 with 5 years of service
Group C	Age 55 with 5 years of service	none
Group D	Age 55 with 5 years of service	age 55 and 20 years of service

Active Member Retirements

Current rates:

- Separate sets of retirement rates applicable to each group
- Groups A/B/C have gender distinct rates that vary based on member's age
- Group D has separate unisex rates for members with 20 or more years of service

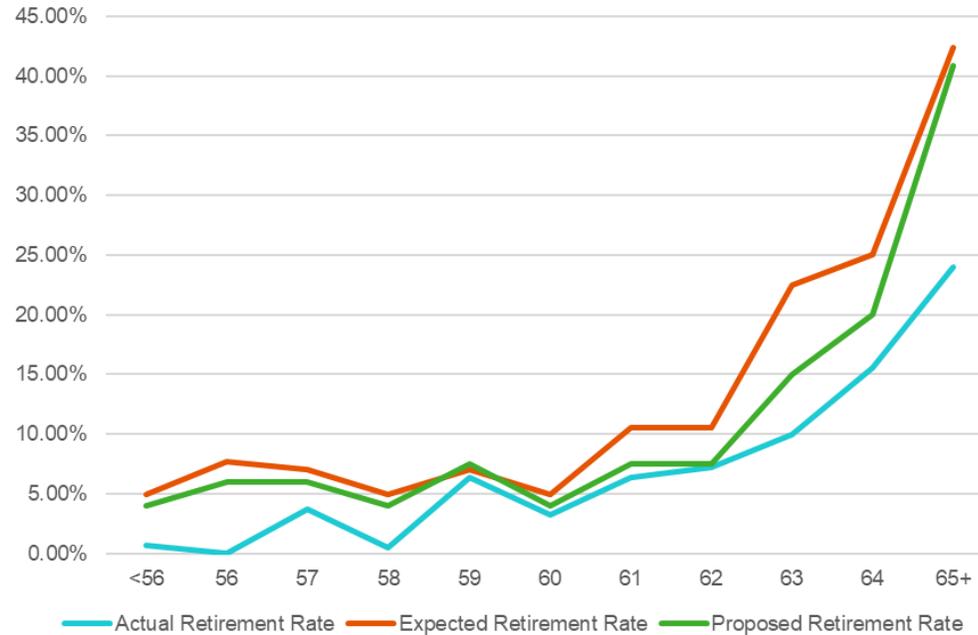
We have analyzed retirement experience on a benefit-weighted basis

- For Groups A/B/C, we separated the experience by gender
- For Group D, we separated the experience between members with less than 20 years of service and members with 20 or more years of service

Active Retirements – Group A

Females:

- There were fewer retirements than expected



Exposures*	Actual Retirements*	Expected Retirements*	Actual to Expected**	Proposed Retirements*	Actual to Proposed**
\$16,116	\$1,348	\$2,010	67%	\$1,649	82%

Recommend reducing the rates throughout all ages

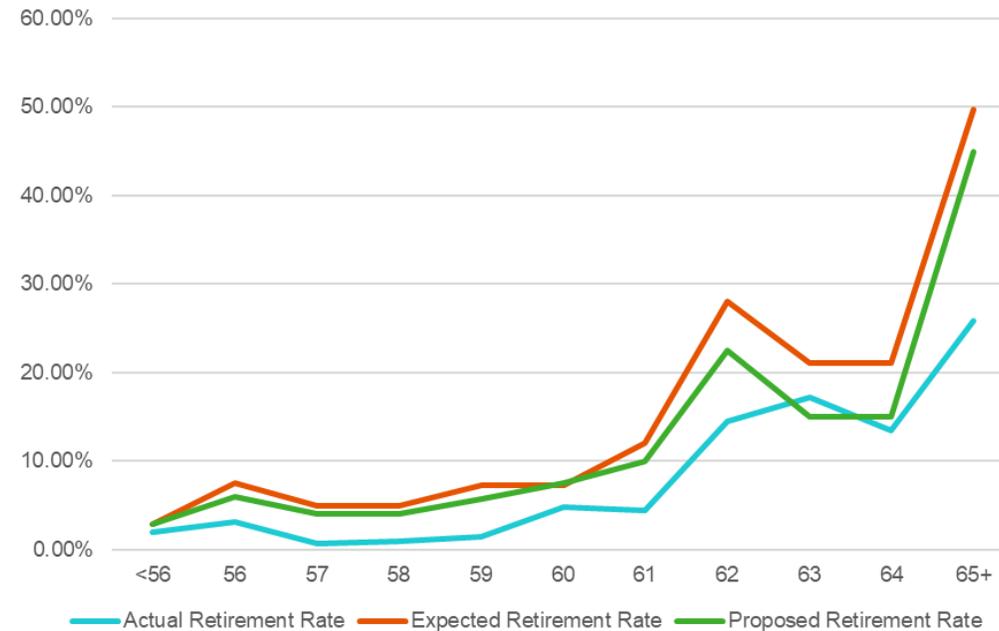
* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Active Retirements – Group A

Males:

- There were fewer retirements than expected



Exposures*	Actual Retirements*	Expected Retirements*	Actual to Expected**	Proposed Retirements*	Actual to Proposed**
\$9,162	\$843	\$1,412	60%	\$1,128	75%

Recommend reducing the rates throughout all ages

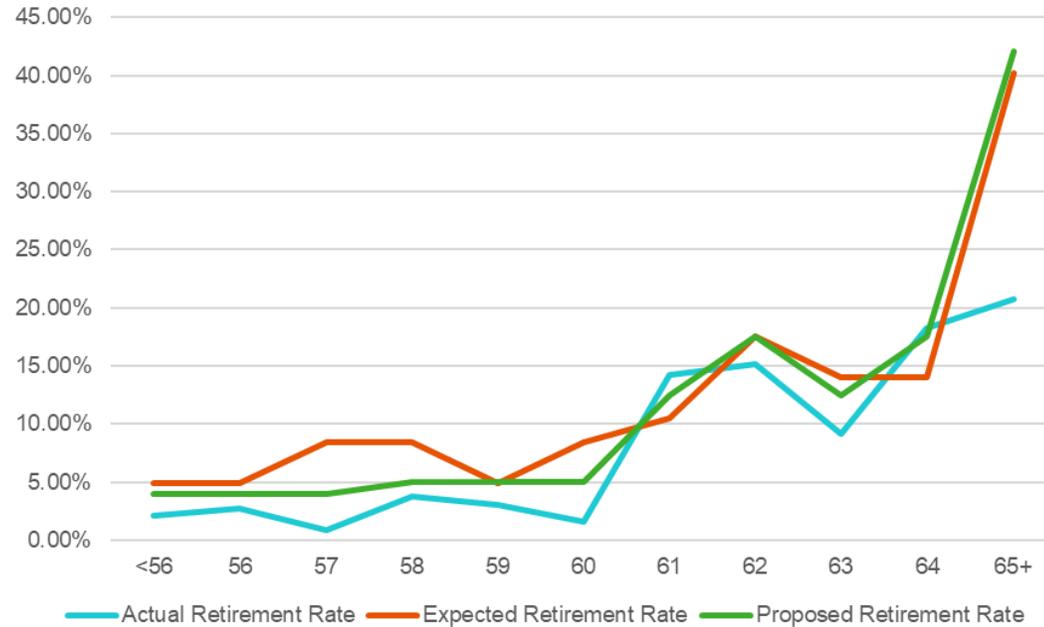
* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Active Retirements – Group B

Females:

- There were fewer retirements than expected



Exposures*	Actual Retirements*	Expected Retirements*	Actual to Expected**	Proposed Retirements*	Actual to Proposed**
\$27,803	\$2,519	\$3,006	84%	\$2,856	88%

Recommend slightly reducing the rates at younger ages and increasing the rates at later ages

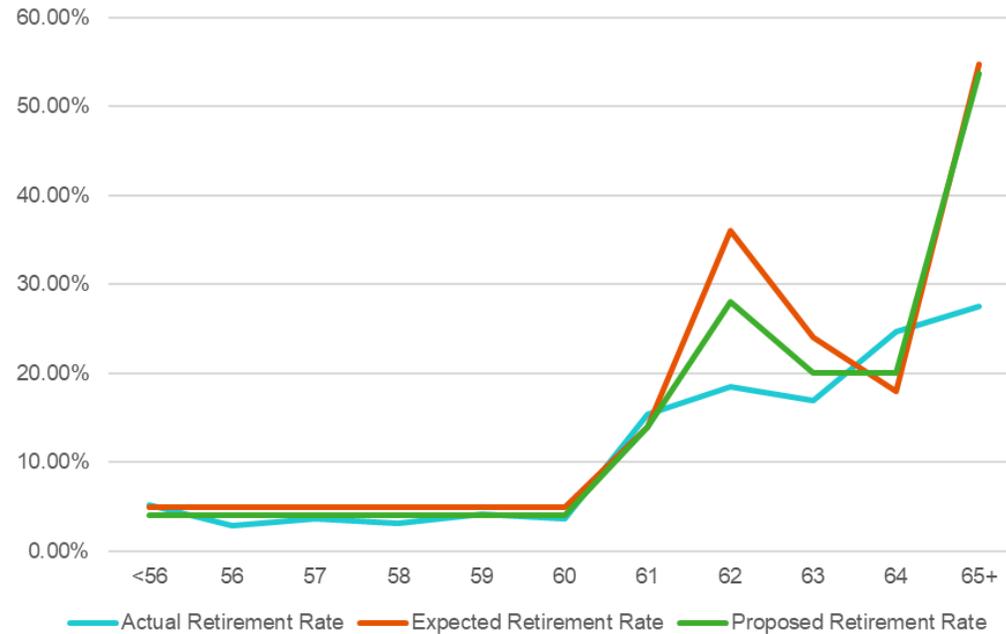
* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Active Retirements – Group B

Males:

- There were fewer retirements than expected



Exposures*	Actual Retirements*	Expected Retirements*	Actual to Expected**	Proposed Retirements*	Actual to Proposed**
\$27,249	\$3,139	\$3,927	80%	\$3,527	89%

Recommend slightly decreasing the rates at most ages

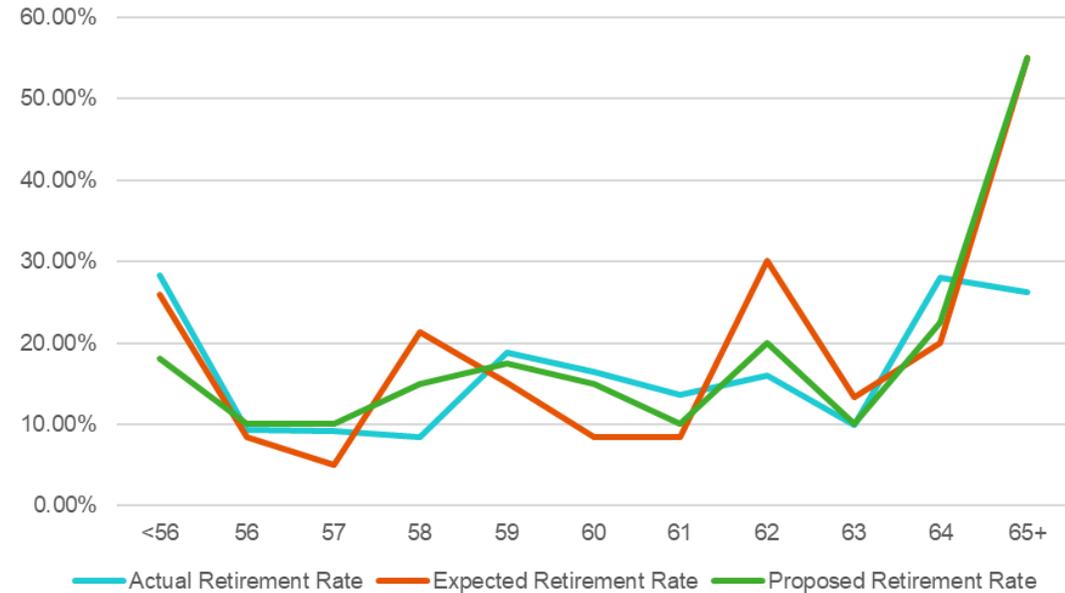
* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Active Retirements – Group C

Unisex:

- There were more actual female retirements than expected, while there were fewer actual male retirements than expected



Exposures*	Actual Retirements*	Expected Retirements*	Actual to Expected**	Proposed Retirements*	Actual to Proposed**
\$17,260	\$2,836	\$3,047	93%	\$2,971	95%

Recommend simplifying the assumption to a unisex table that more accurately aligns with the actual experience for both males and females.

* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Active Retirements – Group D

Members with less than 20 years of service:

- There were over twice as many retirements as expected

Exposures*	Actual Retirements*	Expected Retirements*	Actual to Expected**	Proposed Retirements*	Actual to Proposed**
\$1,094	\$301	\$178	169%	\$237	127%

Recommend increasing the rates for ages 55-59

Members with 20 or more years of service:

- There were fewer retirements than expected, but the limited actual experience is insufficient to warrant making changes to the current assumption

Exposures*	Actual Retirements*	Expected Retirements*	Actual to Expected**	Proposed Retirements*	Actual to Proposed**
\$1,083	\$158	\$204	78%	\$204	78%

Recommend leaving the rates unchanged

* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Inactive Vested Retirements

The current assumption is that 100% of inactive vested members will retire at normal retirement age (NRA)

We have analyzed inactive vested (IV) retirement experience on a benefit-weighted basis for all members

- Actual experience has shown that a material number of people have retired from inactive status earlier than their NRA, so we recommend implementing IV retirement rates that better match the actual experience.

Summary of Experience:

- Of \$6,328,000 in benefits from IV members eligible to commence early with reduced benefits, \$507,000 actually retired
- Of \$1,230,000 in benefits from IV members eligible to commence normal retirement benefits, \$577,000 actually retired
- We recommend adjusting the current IV retirement rates to 10% for each early retirement age (ERA) until NRA, then 100% of the remaining inactive vested members retire at NRA.

Termination

Experience shows that more active female members are terminating prior to retirement than expected, while the amount of active male members terminating prior to retirement closely aligns with the current assumptions.

Current rates are service-based and sex-distinct. There are separate sets of rates for each of the following groups: Males, Females Ages 25-34, and All Other Females.

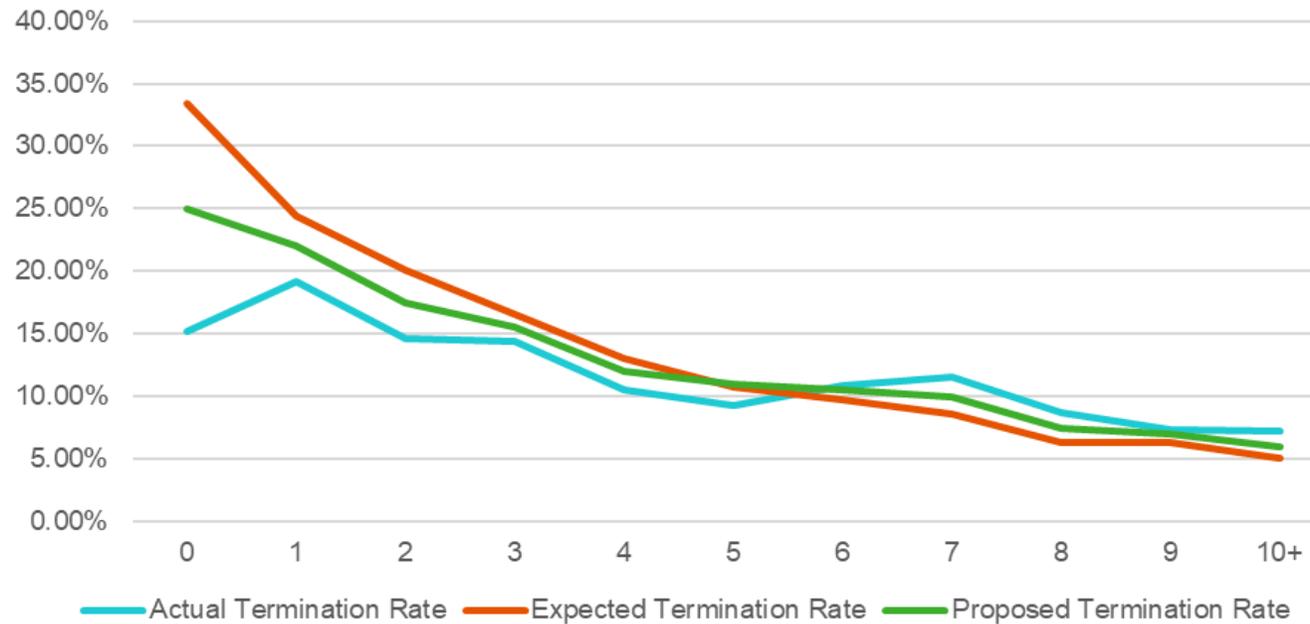
- Current rates represent “total” turnover and a liability “load” is used to hold additional liability for terminating members to offset potential losses due to rehires
- The current combination of turnover rates and liability loads creates volatility in the liabilities

We recommend a change in methodology that minimizes the volatility in the liabilities

- Recommended rates are determined net of rehires and no liability loads are applied

The graphs that follow show the actual, expected, and proposed termination rates based on service

Termination – Females



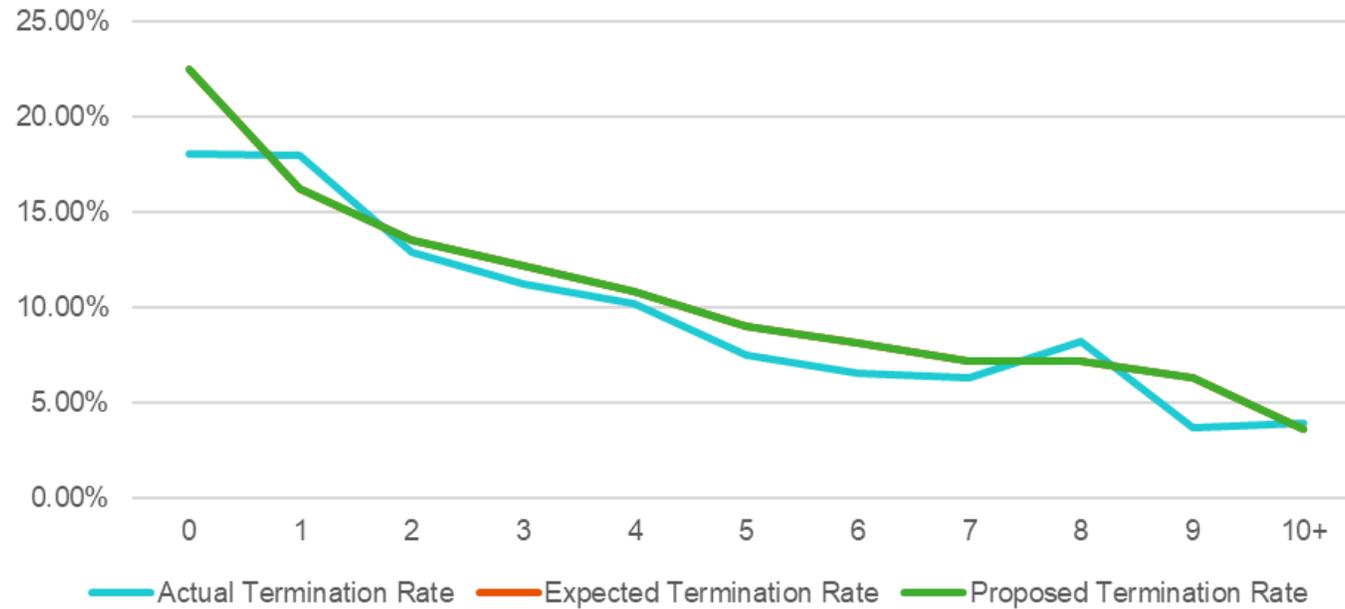
Exposures*	Actual Benefits for Participants who Terminated*	Expected*	Actual to Expected**	Proposed*	Actual to Proposed**
\$43,713	\$3,822	\$3,345	114%	\$3,580	107%

Recommend simplifying the female rates to one set of slightly reduced rates for all females

* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Termination – Males



Exposures*	Actual Benefits for Participants who Terminated*	Expected*	Actual to Expected**	Proposed*	Actual to Proposed**
\$73,801	\$3,950	\$3,990	99%	\$3,990	99%

Recommend leaving the male rates unchanged

* Based on annual benefits in thousands of dollars

** Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Disability Retirement

Experience over the prior five years shows that fewer active members retired under a disability pension than expected

From 2014 to 2019:

- \$87k in benefits from active female members were expected to start receiving a disability pension; and
- \$40k in benefits from active female members actually started receiving a disability pension

We recommend leaving the current female rates related to disability retirement unchanged

- \$195k in benefits from active male members were expected to start receiving a disability pension; and
- \$173k in benefits from active male members actually started receiving a disability pension

We recommend leaving the current male rates related to disability retirement unchanged

Spouse Information

Current assumptions:

- 85% of male members and 50% of female members are married
- Male spouses are three years older than female spouses
- 100% of spouses are opposite gender

We have limited information on marital status

We reviewed actual election information from the data and the percentages are slightly lower than the current assumption of 85%/50%. However, the same assumption is used to value pre-retirement death benefits, which is based on actual marital status at the time of death.

Therefore, we recommend no change to these assumptions



Appendix

Assumed Rates of Salary Increase (*continued*)

The following tables show the total current and proposed individual salary increase assumption by age, adjusted to reflect the current inflation assumption of 2.50% and the proposed inflation assumption of 2.30% respectively:

Age	Current Total Salary Increase Rate	Proposed Total Salary Increase Rate
0	5.00%	7.00%
1	5.00%	6.50%
2	5.00%	5.75%
3	5.00%	5.25%
4	5.00%	5.00%
5	5.00%	4.75%
6	5.00%	4.75%
7	5.00%	4.75%
8	5.00%	4.75%
9	5.00%	4.75%
10+	5.00%	4.50%

Active Retirement

The following tables show the proposed active retirement rates for members in Group A:

Group A - Males

Age	Proposed Active Retirement Rate
55	3.00%
56	6.00%
57	4.00%
58	4.00%
59	5.75%
60	7.50%
61	10.00%
62	22.50%
63	15.00%
64	15.00%
65	45.00%
66	15.00%
67	15.00%
68	15.00%
69	15.00%
70+	100.00%

Group A - Females

Age	Proposed Active Retirement Rate
55	4.00%
56	6.00%
57	6.00%
58	4.00%
59	7.50%
60	4.00%
61	7.50%
62	7.50%
63	15.00%
64	20.00%
65	20.00%
66	20.00%
67	20.00%
68	25.00%
69	25.00%
70+	100.00%

Active Retirement

The following tables show the proposed active retirement rates for members in Group B:

Group B - Males

Age	Proposed Active Retirement Rate
55	4.00%
56	4.00%
57	4.00%
58	4.00%
59	4.00%
60	4.00%
61	14.00%
62	28.00%
63	20.00%
64	20.00%
65	40.00%
66	35.00%
67	30.00%
68	30.00%
69	30.00%
70+	100.00%

Group B - Females

Age	Proposed Active Retirement Rate
55	4.00%
56	4.00%
57	4.00%
58	5.00%
59	5.00%
60	5.00%
61	12.50%
62	17.50%
63	12.50%
64	17.50%
65	27.50%
66	22.50%
67	17.50%
68	17.50%
69	17.50%
70+	100.00%

Active Retirement

The following tables show the proposed active retirement rates for members in **Group C** and **Group D**:

Group C - Unisex

Age	Proposed Active Retirement Rate
55	20.00%
56	10.00%
57	10.00%
58	15.00%
59	17.50%
60	15.00%
61	10.00%
62	20.00%
63	10.00%
64	22.50%
65	35.00%
66	35.00%
67	35.00%
68	35.00%
69	35.00%
70+	100.00%

Group D - <20 Years of Service

Age	Proposed Active Retirement Rate
55	20.00%
56	20.00%
57	20.00%
58	15.00%
59	15.00%
60	15.00%
61	10.00%
62	25.00%
63	25.00%
64	25.00%
65+	100.00%

Group D – 20+ Years of Service

Age	Proposed Active Retirement Rate
55	40.00%
56	35.00%
57	30.00%
58	25.00%
59	20.00%
60	15.00%
61	10.00%
62	10.00%
63	10.00%
64	10.00%
65	15.00%
66	10.00%
67	25.00%
68	25.00%
69	25.00%
70+	100.00%

Inactive Retirement

The following tables show the proposed inactive retirement rates for members in all groups:

All Groups

Eligibility	Proposed Inactive Retirement Rate
Early Retirement Age	10.00%
Normal Retirement Age	100.00%

Disability Retirement – Females

The following tables show the proposed disability retirement rates for female members in all groups:

Age	Proposed Disability Retirement Rate
20-26	0.0050%
27	0.0055%
28	0.0060%
29	0.0060%
30	0.0065%
31	0.0070%
32	0.0075%
33	0.0080%
34	0.0085%
35	0.0085%
36	0.0100%
37	0.0110%
38	0.0125%
39	0.0140%
40	0.0150%

Age	Proposed Disability Retirement Rate
41	0.0170%
42	0.0190%
43	0.0210%
44	0.0230%
45	0.0250%
46	0.0290%
47	0.0330%
48	0.0370%
49	0.0410%
50	0.0450%
51	0.0540%
52	0.0630%
53	0.0720%
54	0.0810%
55	0.0900%

Age	Proposed Disability Retirement Rate
56	0.1035%
57	0.1170%
58	0.1305%
59	0.1440%
60	0.1575%
61	0.1575%
62	0.1575%
63	0.1575%
64	0.1575%
65	0.1575%
66	0.1575%
67	0.1575%
68	0.1575%
69	0.1575%

Disability Retirement – Males

The following tables show the proposed disability retirement rates for male members in all groups:

Age	Proposed Disability Retirement Rate
20-26	0.0100%
27	0.0110%
28	0.0120%
29	0.0120%
30	0.0130%
31	0.0140%
32	0.0150%
33	0.0160%
34	0.0170%
35	0.0170%
36	0.0200%
37	0.0220%
38	0.0250%
39	0.0280%
40	0.0300%

Age	Proposed Disability Retirement Rate
41	0.0340%
42	0.0380%
43	0.0420%
44	0.0460%
45	0.0500%
46	0.0580%
47	0.0660%
48	0.0740%
49	0.0820%
50	0.0900%
51	0.1080%
52	0.1260%
53	0.1440%
54	0.1620%
55	0.1800%

Age	Proposed Disability Retirement Rate
56	0.2070%
57	0.2340%
58	0.2610%
59	0.2880%
60	0.3150%
61	0.3150%
62	0.3150%
63	0.3150%
64	0.3150%
65	0.3150%
66	0.3150%
67	0.3150%
68	0.3150%
69	0.3150%

Termination

The following tables show the proposed termination rates for members in all groups:

Females

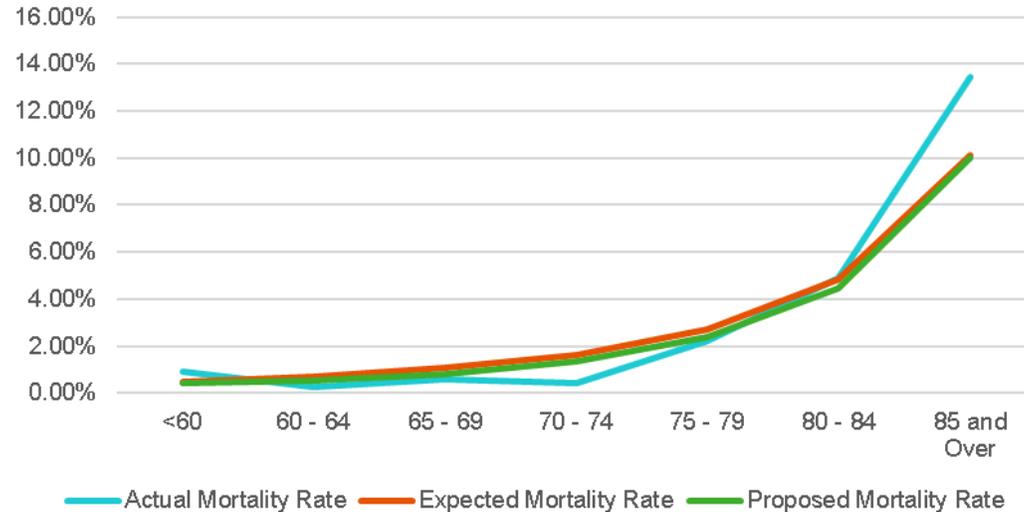
Service	Proposed Termination Rate
0	25.00%
1	22.00%
2	17.50%
3	15.50%
4	12.00%
5	11.00%
6	10.50%
7	10.00%
8	7.50%
9	7.00%
10+	6.00%

Males

Service	Proposed Termination Rate
0	22.50%
1	16.20%
2	13.50%
3	12.15%
4	10.80%
5	9.00%
6	8.10%
7	7.20%
8	7.20%
9	6.30%
10+	3.60%

Analysis – Healthy Retiree Mortality (Female) – Groups A/B/C

Actual Versus Proposed Experience, Benefit-Weighted Basis



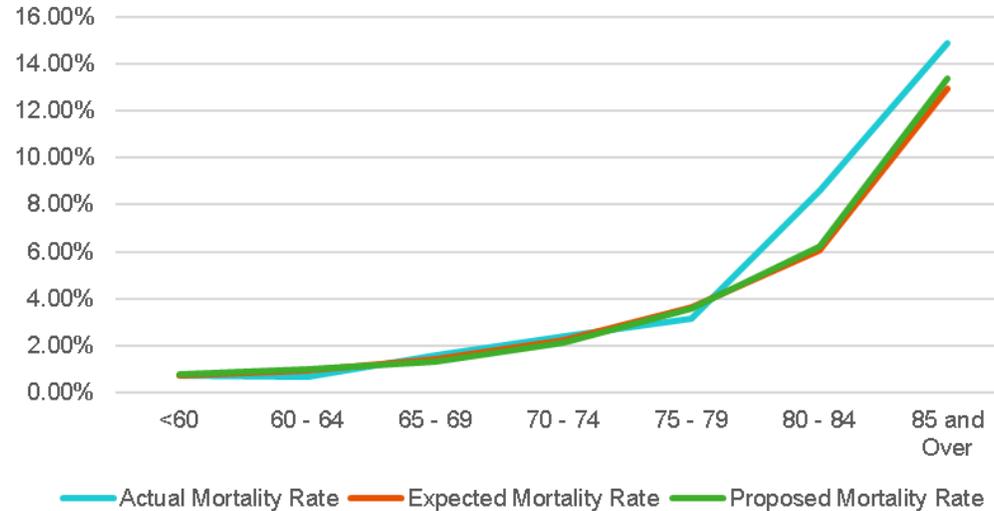
Basis	Exposures	Actual Deaths/ Benefits for Participants who Died	Expected	Actual to Expected**	Proposed	Actual to Proposed**
Counts	7,276	140	178	79%		
Benefits*	\$48,047	\$814	\$1,011	81%	\$888	92%

* Based on annual benefits in thousands of dollars

**Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Analysis – Healthy Retiree Mortality (Male) – Groups A/B/C

Actual Versus Proposed Experience, Benefit-Weighted Basis



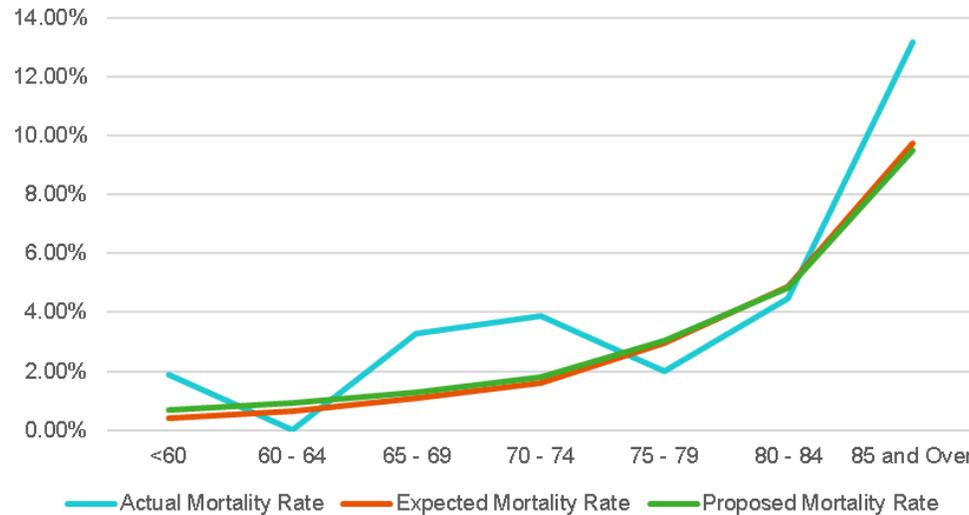
Basis	Exposures	Actual Deaths/ Benefits for Participants who Died	Expected	Actual to Expected**	Proposed	Actual to Proposed**
Counts	4,967	183	147	124%		
Benefits*	\$60,430	\$1,522	\$1,410	108%	\$1,395	109%

* Based on annual benefits in thousands of dollars

**Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Analysis – Beneficiary Mortality (Female) – Groups A/B/C

Actual Versus Proposed Experience, Benefit-Weighted Basis



Actual Deaths/ Benefits for Participants who Died

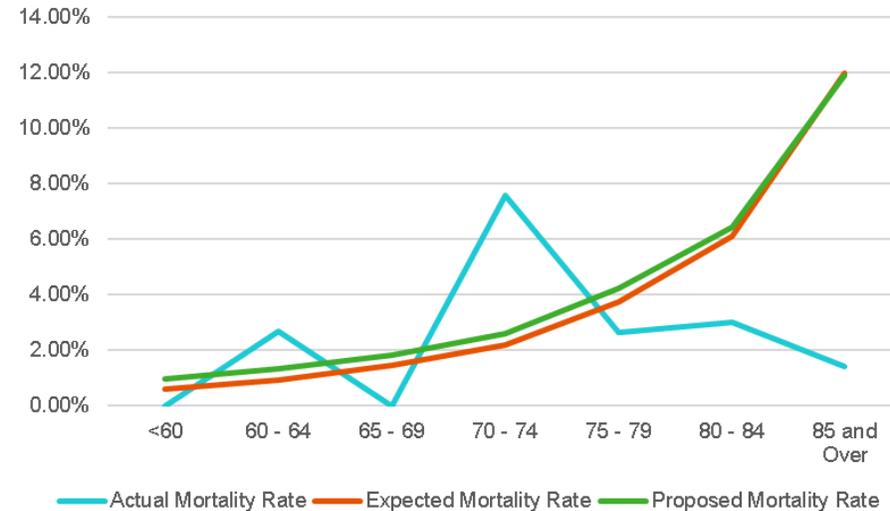
Basis	Exposures	Actual Deaths/ Benefits for Participants who Died	Expected	Actual to Expected**	Proposed	Actual to Proposed**
Counts	831	43	31	140%		
Benefits*	\$4,807	\$207	\$149	139%	\$154	135%

* Based on annual benefits in thousands of dollars

**Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Analysis – Beneficiary Mortality (Male) – Groups A/B/C

Actual Versus Proposed Experience, Benefit-Weighted Basis



Basis	Exposures	Actual Deaths/ Benefits for Participants who Died	Expected	Actual to Expected**	Proposed	Actual to Proposed**
Counts	160	7	5	130%		
Benefits*	\$860	\$26	\$27	98%	\$30	87%

* Based on annual benefits in thousands of dollars

**Actual to Expected/Proposed ratios indicate how well the actual experience aligns with the current/proposed assumptions. The closer the ratio is to 100%, the closer the current/proposed assumptions align with the actual experience.

Inactive/Deferred Methodology Change

Current Methodology:

All Active members who terminate become Inactive, then Inactive members become Deferred after remaining Inactive for at least 5 years.

- *Active Members*: Liability based on accrued benefit
- *Inactive Members*: Liability based on 200% of the accumulated contributions
- *Deferred Members*: Liability based on accrued benefit

Consistently experiencing large turnover losses for prior actives and unexpected gains for prior Inactives who return-to-work (due to the 200% load), resulting in net experience losses

Proposed Methodology:

All Active members or Inactive members who terminate/are terminated with at least 5 years of service become immediately Deferred.

- *Active Members*: Liability based on accrued benefit
- *Inactive Members*: Liability based on 100% of the accumulated contributions (remove the additional load)
- *Deferred Members*: Liability based on accrued benefit

Produces small turnover gains for prior actives and losses for prior Inactives who return-to-work (due to removing 200% load)